NON-PROTEIN, HIGH STABILITY FAT EMULSION COMPOSITION AND METHOD OF PRODUCTION

The present invention relates to a high stability emulsion of finely divided fat, and more particularly to such emulsions which are protein-free and have no or low sodium contents. The invention also relates to a method of producing such emulsions.

BACKGROUND OF THE INVENTION

Stable emulsions of finely divided fat have been used in the art for many purposes, including that of powdered shortenings, carriers, e.g. for artificial flavors, and in coffee whiteners. The use of these emulsions in certain environments has presented difficult problems to the art, due to the instability of the emulsion in those environments. Thus, by way of examples, the usual emulsions provided by the art are not stable in either high or low pH environments, alcohol containing environments, freeze-thaw environments and high temperature environments. These and other such environments may be referred to as "instability environments," and the art has proposed a number of solutions to this instability problem.

The difficulties of these instability environments can be illustrated by the example of a coffee whitener. Thus, while the more usual emulsions are quite satisfactory for more typical uses, e.g. as dough ingredients and as carriers, these more usual emulsions are not satisfactory in coffee whiteners, since the requirements for coffee whiteners are much more stringent than the requirements for the emulsions in the typical uses. Among the special problems presented for use of these emulsions as a coffee whitener is the ability of the emulsions to be quickly dispersed in a nonagglomerating manner, at low solids content, in hot brewed coffee, and without settling in the brewed coffee, "oiling out" or producing an unacceptable taste. In addition, the coffee whiteners must provide a high whiteness to the coffee. Such properties are not common to the necessary properties of such emulsions for the more typical uses, and the art has long appreciated that an emulsion suitable for such other typical uses is not necessarily suitable for a coffee whitener. Indeed, most often, emulsions which are quite acceptable for these other typical uses, are quite unacceptable for coffee whiteners.

While many powdered dry fat emulsions are known, as discussed above, only a few of these emulsions are acceptable as coffee whiteners for the foregoing reasons. Principally, acceptable emulsions have contained from about 25 to 50% vegetable fat, 30 to 65% of a filler carbohydrate, usually corn syrup solids or sugar, 4 to 15% protein, usually a caseinate, about 1 to 4% emulsifiers, and minor amounts of stabilizers, colors, flavors, anti-caking agents and the like. The fat, of course, is finely divided in order to effect whitening when dispersed in the coffee.

The protein, especially the caseinates, are necessary in these prior whitener compositions, for two reasons. First, without the protein, the prior art had found that the mixed ingredients, dispersed in water, formed an emulsion that cannot be effectively dried to produce the powdered coffee whitener. Second, the prior art has proceeded on the assumption that without the protein, acting as a protective stabilizer, a stable emulsion will not result in the brewed coffee, causing the difficulties discussed above. Therefore, generally speaking, prior art coffee whiteners have always incorporated substantial amounts protein, e.g. caseinates, into the coffee whitener emulsion composition.

As another example of an instability environment, emulsions of this type are used in food compositions which must be retorted in packaging, e.g. puddings, custards and the like. Retort temperatures in the food composition, e.g. 105° C., cause instability in the usual fat emulsions. Again, the approach of the prior art has been to incorporate substantial amounts of protein, e.g. caseinates, in the fat emulsions to at least partially compensate for the instability of the emulsion.

A further important example of an instability environment is that of acid compositions which require a high fat content. The combination of low pH and high fat requirements cause most unstable conditions. While coffee is a relatively low pH composition, the amount of fat required to whiten the coffee is relatively low. Creamers, on the other hand, must provide relatively high fat contents to the creamed compositions, e.g. the fat emulsion used as a creamer will usually have 50% or more fat. When the creamers are used in acid compositions, instability of the emulsion is a most difficult problem. The prior art emulsions have not been satisfactory in these compositions, especially in the more acid systems such as fruit drinks, carbonated beverages, wine and the like.

Thus, as examples, but not all inclusive, instability environments include: coffee whiteners; creamers for fruit drinks, soft drinks (liquid or powder), soups, brewed tea (hot or cold), gelatin desserts; bases for sherbert-like frozen desserts; shortening powders; fat for vinegar containing salad dressings; gravies; and non-dairy bar mixes. The present fat emulsion, as explained below, is applicable to all of the above and other instability environments.

Other examples of "instability environments" could also be provided, but in summary, all of the "instability environments" have necessitated special fat emulsions, nearly all of which special fat emulsions rely upon the inclusion of substantiall amounts of protein to improve the emulsion stability.

However, the inclusion of protein in these special emulsions causes distinct disadvantages. The protein, first of all, is relatively expensive, and, indeed, constitutes a significant cost of the emulsion. Further, the inclusion of dairy protein in the emulsion renders the emulsion unacceptable to some ethnic groups in some uses, e.g. coffee whitened with a dairy product. Also, the protein is, generally, the least soluble of the ingredients in the emulsion, and in the case of a coffee whitener, delays full dispersion of the fat particles in the coffee to achieve whitening thereof. Additionally, the protein presents a hypoallergenic problem to some users. Finally, the protein of choice is sodium caseinate, and the use of substantial amounts thereof in these instability environments results in increased sodium contents of the resulting composition. Of course, excessive sodium in diets is being recognized as a health problem. Further, the isoelectric point of sodium casenate (pH of about 4.6) renders it unstable in acid environments, e.g. at a pH lower than about 4.6.

Accordingly, the art has sought high stability emulsions which do not require the use of protein therein. One approach of the art in this regard is illustrated by U.S. Pat. No. 4,242,364, wherein the protein in a coffee whitener is simply eliminated and its function is more or